REMARKS

Claims 1-5 are presently pending in the application. Reconsideration and allowance of all claims are respectfully requested in view of the following remarks.

As a preliminary matter, the Applicants respectfully request that the Examiner acknowledge the claim of foreign priority, which documents should have been received from the International Bureau.

Turning to the Office Action, the Examiner has rejected Claims 1-5 under 35 U.S.C. §102(e) as allegedly being anticipated by Kaneko et al. (USP 6,800,388). In addition, the Examiner has rejected Claims 1-5 under 35 U.S.C. §102(b) as allegedly being anticipated by Monceaux et al.

Specifically, the Examiner alleges in the Office Action that:

"Kaneko discloses a catalyst composition which comprises: a perovskite composite oxide having the formula ABO_3 and the formula $A'_{1-x}A''_xB'_{1-y}B''_yO_3$ wherein A' is La, Ce or both, A' is at least one element selected from the group consisting of La, Ca, Sm, Ce, Sr, Ba and Pr, B' is at least one element selected from the group consisting of Co, Fe, Mn, and Gd, and B" is at least one element of noble metals, etc. (see col. 18, claim 1). See also Table 3 in col. 15 & 16.

There is no patentable distinction seen between the claimed catalyst and that disclosed by Kaneko, thus the claims are anticipated."

The Applicants respectfully traverse the Examiner's statement and the rejection of the claims.

The present invention is an exhaust gas purifying catalyst comprising a composite oxide having a perovskite structure represented by the general formula, $A_{1-x}A'_xB_{1-y-z}B'_yPt_zO_3$. In this formula, A represents at least one element selected from only rare-earth elements each having a valence of 3 as the only valence A, and may additionally have one or more other rare-earth elements that can have a valence other than 3. A' represents at least one element selected from alkaline earth metals and Ag. B represents at least one element selected from Fe, Mn, and Al. B' represents at least one element selected from transition elements excluding Pt, Fe, Mn, Co and the rare-earth elements. The atomic ratios x, y and z satisfy the relations: $0 < x \leq 0.5$, $0 \leq y < 0.5$, and $0.08 \leq z \leq 0.5$.

The catalyst must have Pt to effectively remove CO from exhaust gas. To achieve a stable Pt over a long period of time, it was discovered that having a significant proportion of a rare-earth metal that can only have a valence of 3 is important. The other large cations of the perovskite structure must be a small valence metal ion, which is selected from alkaline earth metals and Ag which always have valences of 2 or less in such an oxide structure. The avoidance of some metals to achieve a stable Pt, for example Co, is recited. The specific combination of these features was not previously disclosed to give stability to the Pt in perovskite structures so that a long life exhaust gas purification catalyst can be prepared.

The compositions of the present invention are perovskite structures. A perovskite structure is a crystal structure that is ideally cubic, with a framework of corner-sharing octahedra of relatively small cations (B, B', B", and Pt in the compositions of Kaneko and the

present invention) surrounded by six oxygens. Within this framework are placed other larger cations (A, A', and A" in the compositions of Kaneko and the present application) surrounded by twelve anions. Tilting of the octahedra and other distortions often lower the symmetry from cubic, giving the materials modified properties and decreasing the coordination of the central cation. This flexibility gives the structure the ability to incorporate ions of different sizes and charges. Depending upon the metals included in the crystal, different distortions result, leading to different properties. Observing different properties indicates that different structures have resulted. The composition of Kaneko, having the formula $A'_{1-x}A''_xB'_{1-y}B''_yO_3$ where $0.1<x<0.5$ and $0.05<y<1$, is directed to give different distortions in the perovskite structure than the formula, $A_{1-x}A'_xB_{1-y-z}B'_yPt_zO_3$ where $0<x\leq0.5$, $0\leq y<0.5$, and $0.08 \leq z \leq 0.5$.

Since perovskite structures include distortions that result in different properties depending upon the nature of the metals in the structure, the teaching of different relative sizes and valences of these metals for the different groups of metals in the compositions means that different inventions were taught as those structures were different as implied by the resulting different properties. One looking to design a long living exhaust gas catalyst to remove CO would not look to a fuel cell catalyst to form H_2 for inspiration. These are different catalysts for different reactions. As the direction for the composition taught by Kaneko is often contrary to the direction necessary for the composition of the present invention, it is unlikely that a good exhaust gas purification catalyst could be identified from Kaneko by one of ordinary skill in the art. No single example of a complex in Kaneko has the necessary structure of the present invention. Because Kaneko does not teach a species falling within the present claims, Kaneko does not anticipate the present claims.

Additionally, Kaneko does not render the present claims obvious. There is no teaching or suggestion in Kaneko of the specific combination of the present compositions and there is no motivation in Kaneko for one to pick and choose particular elements to achieve the particular purpose of the present invention (which is not the objective of Kaneko). The structural differences between Kaneko and the present invention will be detailed below.

A, A' and A" are the large cations in the crystal structure for the compositions of Kaneko and the present invention. The composition of Kaneko allows A' to be **La** and/or Ce whereas the present invention is where A is any rare earth element: **Sc, Y, La, Nd, Pm, Gd, Dy, Ho, Er, Lu**, Ce, Pr, Tb, Sm, Eu, Tm, and Yb and must contain one of the elements in bold as they can only have a valence of 3 and one or more of those elements of only valence 3 is present as A and preferably makes up more than 50% of A. The requirement in the present invention for the presence of a rare earth metal that can have only a valence 3 is absent in Kaneko. Only compositions in Kaneko that contain **La** can fulfill this extremely important feature of the present invention and three of the 20 compositions used as examples of effective compositions do not contain **La** indicating that there is nothing critical about a rare-earth with only a valence of 3 for the fuel cell catalyst of Kaneko. The importance of a rare-earth metal of only valence 3 in present invention to achieve the desired long active exhaust gas purification catalyst to remove CO a was not claimed or suggested by the composition of Kaneko for an effective fuel cell catalyst to generate H_2, since compositions without **La** were effective in Kaneko.

The composition of Kaneko allows A" to be one or more of Ce, Pr, **La**, Sm, *Ca, Sr, Ba*, whereas the present invention's A' is one or more alkaline earth metal: *Ca, Sr, Ba, Be, Mg,* and

Ra or Ag. Again, these lists indicate different requirements of their respective compositions. These lists are given with alkaline earth metals in italics and proceed from metal ions which display valences from high to low. Alkaline earth metals have only a valence of 2. Kaneko claims alkaline earth metals *Ca, Sr*, and *Ba* but does not distinguish their effect on the resulting structure from that of the rare earth metals Ce, Pr, **La**, or Sm and does not give a single example out of 20 where an alkaline earth metal is present in a complex. The necessary valence of A" is 2 or greater for the composition of Kaneko. Only four of Kaneko's 20 examples have Sm, which may have a valence of 2 or 3, all others examples include a metal that have a valence of 3 or greater. It is highly likely that Sm has a valence of 3 in those compositions as it displays the same properties of a fuel cell catalyst as does the 16 other examples in Kaneko which have a valence of 3 or greater. In contrast, the present invention requires a valence of 2 or less for A' as alkaline earth metals have only a valence of 2 and Ag is normally 1 and rarely 2, and is effectively 1 in the present invention as inferred by claim 4. This difference in valence of A' in the present invention and A" in Kaneko is inherent to the listed metals, and this feature of the present invention is not illustrated by Kaneko. One of ordinary skill in the art would conclude that Kaneko teaches away from the present invention as the different coordination numbers of the two inventions give different desired properties.

The small cations of the perovskite structures B, B', B", and Pt in the present invention and in Kaneko also display significant differences. In Kaneko B' is Co, Fe, Mn, and Gd while the present invention requires Fe, Mn, and Al. One should look to those elements that are not common to both lists to distinguish the difference. In Kaneko, all elements have ionic radii which are necessarily greater than 72 pm and Gd, the non-transition

metal listed and recited in 20% of the examples, is always greater than 107 pm. The present invention lists elements with ionic radii which can be no greater than 106 pm and Al, the non-transition metal listed, can be no greater than 67 pm. Therefore, to get the properties for a long life exhaust gas purification catalyst to remove CO, a smaller cation is indicated in the present invention than the cation included to get the fuel cell catalyst to generate H_2 of Kaneko. Again, one of ordinary skill in the art of exhaust gas catalysts would be cognizant of this fact and would not look to Kaneko, which describes a fuel cell catalyst, for inspiration.

In Kaneko, B" is at least one of the noble metals. In the present invention a significant presence of Pt is required and B' can be any transition metal with the exception of Pt, Fe, Mn, and Co. This draws another significant distinction between the claimed composition of Kaneko and the present invention. Kaneko recites the use of Co for B' while the present invention teaches that Co must be absent from the composition, as the presence of Co would destabilize the Pt and would not result in a long life exhaust gas purification catalyst. The teachings of Kaneko and the present application differ as the presence of Pt is not required in Kaneko as in the present invention. Again, Kaneko can be viewed as teaching away from the present invention by the inclusion of Co.

It is clear from the above analysis that the present invention describes a surprising result, that being the excellent longevity of the exhaust purification catalyst, that was not taught or suggested by Kaneko, directed to a fuel cell catalyst, as Kaneko did not teach the requirements in the present invention of the presence of Pt and that A must contain at least one of the rare earth elements that can only have a valence of 3. Additionally, Kaneko indicates by the list for A" and the effective examples, that A" has a valence that is higher, 2 or

greater (with all examples 3 or greater), than the valence required for A' in the present invention of 2 or less. Additionally, Kaneko permits the incorporation of Co to the complex, which is the only stated metal that must be completely excluded from the composition of the present invention. For at least these reasons, Applicants request that the Examiner withdraw this rejection.

With respect to Monceaux, the Examiner wrote:

"Claims 1-5 are rejected under 35 U.S.C. 102(b) as being anticipated by Monceux et al.

Monceux discloses a catalyst containing an active phase of the perovskite-type structure having the general formula: $L_xL'_{1-x}M_yM'_z\Phi_{1-y-z}O_3$, *wherein L is an element selected from the lanthanides and the rare earth metals, L' is an element selected from Sr, Ca, Ba, Ce, K, Bi, Rb and Na, M is a transition metal selected from Cr, Mn, Fe, Co, Ni and Cu, M' is at least one metal selected from Pt, Ru, Pd, Rh, etc. (see col. 1, ln 40-57). See also Table II in col. 4, catalyst 9.*

There is no patentable distinction seen between the claimed catalyst and that disclosed by Monceux, thus the claims are anticipated."

Applicants respectfully submit that Monceux neither teaches nor suggests the present invention. The composition described in Monceux and the present invention differ. Monceux defines the composition as $L_xL'_{1-x}M_yM'_z\Phi_{1-y-z}O_3$ where $0\leq 1-x<0.5$, $0.85<y\leq 1$, $0\leq z<0.08$, and $0.85<y+z\leq 1$ where the present invention defines $A_{1-x}A'_xB_{1-y-z}B'_yPt_zO_3$ where $0<x\leq 0.5$, $0\leq y<0.5$, and $0<z\leq 0.5$. L and L' in Monceux correspond to A and A' in the present invention. M and M' in Monceux correspond to B and B' in the present invention. There is no equivalent to Φ in the present invention. B may be nearly 0 in the present invention but its

equivalent M must be in excess of 0.85 in Monceux. see Monceux col. 1, ln 55-57. Monceux requires very low levels of a noble metal as z must be less than 0.08. As above with Kaneko, the requirement that a portion of the rare earth metal has a valence of only 3 found in the present invention is absent in Monceux. The requirement of Pt in the present invention is absent in Monceux. Co is a preferred metal for M in Monceux and must be avoided in the present invention to achieve the desired stability of Pt in the catalyst imparting long life. To readily distinguish the present invention from any possible composition that can be discerned from Monceux, the range of z in the present invention was amended in claim 1 from $0<z\leq 0.5$ to $0.08\leq z<0.5$. This change is consistent with all embodiments described in the present application and readily distinguishes Monceux, which has a goal to minimize the amount of noble metals in the complex, from that of the present invention, which was to stabilize the Pt in the catalyst. Applicants request that the Examiner consider the claims in view of this change to Claims 1 and 5, withdraw this rejection, and allow the claims.

If the Examiner believes that there is any issue which could be resolved by a telephone or personal interview, the Examiner is respectfully requested to contact the undersigned attorney at the telephone number listed below.

Applicants hereby petition for any extension of time which may be required to maintain the pendency of this case, and any required fee for such an extension is to be charged to Deposit Account No. 50-0951.

Respectfully submitted,

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